

In re Patent Application of:
KAMENOFF
Serial No. **10/694,635**
Filing Date: **October 27, 2003**

REMARKS

Claims 1, 3, 4, and 11-14 remain in this application. Claims 2, 5-10, and 15-23 have been cancelled. Claims 1, 3 and 4 have been amended.

Applicant thanks the Examiner for the detailed study of the application and prior art. Applicant has amended claim 1 to recite the novel and unobvious features of the circuit used in the self-heating battery that delivers its rated capacity when a battery is below a temperature when available battery capacity is limited.

Applicant has cancelled claims 2 and 5-10 and amended claim 1 to recite the switch circuit as comprising the serially connected transistors and a comparator circuit operatively connected to the temperature sensor and having an output operatively connected to at least one transistor in the switch circuit to switch on the heating element when the temperature is below a temperature where available capacity is limited. Claim 1 also recites a load current sensor and a low current comparator and a high current comparator each operatively connected to the load current sensor and each having an output operatively connected to at least one transistor in the switch circuit to lock out the heating element when a battery cell is not in use to prevent the heating element from discharging the battery when stored at cold temperatures.

As to the double patenting rejection for claims 15 and 16, those claims are now cancelled together with the other dependent claims off claim 15, including claims 17-23.

As to the rejection by Lutz, Applicant notes that Lutz is directed to a self-warming battery that includes a

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microcontroller 28 that is operatively connected to two different current sensors 32, 40 and operatively connected to a first switch 30 and a second switch 36 and a temperature sensor. This microcontroller 28 is typically a programmed device and often more expensive as compared to the comparator circuits and transistors such as used in the claimed invention. This microcontroller in Lutz provides an initializing mode, a warming mode and thermostat mode. The graph of FIG. 3 shows the complicated microcontroller operation with different thermal set points T1 and T2 and the operation of the microcontroller relative to the circuit.

The claimed invention, on the other hand, provides a novel and unobvious circuit that can be implemented without use of a microcontroller and instead can be implemented using comparators, a temperature sensor, a load current sensor and serially connected transistors forming a switch circuit. A comparator circuit 112 can be operatively connected to the temperature sensor and have an output operatively connected to at least one transistor in the switch circuit to switch on the heating element when the temperature is below a temperature where available capacity is limited. A low current comparator and a high current comparator are each operatively connected to the load current sensor and each has an output operatively connected to at least one transistor in the switch circuit to lock out the heating element when a battery cell is not in use to prevent the heating element from discharging the battery when stored at cold temperatures.

The comparator circuit connected to the temperature sensor can use a temperature differential for comparing temperature and turning the switch on and off and controlling

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operation of the heating element. Although a microcontroller could provide some comparison using some firmware or software, it uses a sophisticated function compared to the use of a comparator. Indeed, the microcontroller in Lutz is also used for load current sensing as compared to the more simple use of a low current comparator and high current comparator such as shown in FIG. 4 of the instant application, having inputs connected on either side of the load current sensor as illustrated. It is simple but efficient design.

As to Matsuyama, it discloses a battery discharge circuit used in solar panels and a light transmittable plate covers the surface of the solar panels. Matsuyama nowhere suggests a battery discharge circuit operatively connected to a self-heating battery in combination therewith. Indeed, the function in Matsuyama is different and does not provide for a battery discharge circuit such as when the battery is old or needs to be removed from service. Indeed, the light sensing circuit in Matsuyama is much different from the claimed combination in the present Amendment.

McGrath shows a standard charge protection circuit, but nowhere suggests any charge protection circuit in combination with a self-heating battery such as claimed in this Amendment.

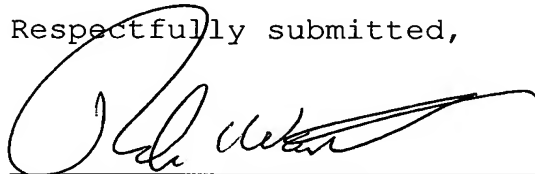
Okutoh shows an extra cell for an over-voltage protection, but nowhere discloses a flying cell circuit used in combination with the self-heating battery, and more particularly, a flying cell circuit such as in FIG. 7.

Applicant contends that the present case is in condition for allowance and respectfully requests that the Examiner issue a Notice of Allowance and Issue Fee Due.

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If the Examiner has any questions or suggestions for placing this case in condition for allowance, the undersigned attorney would appreciate a telephone call.

Respectfully submitted,



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